

genus *Nepheronia*, although in this case the green colour is concealed by the opaque superficial scales. The rapid change of tint noted by Burchell is clearly associated with this unusual development of pigment between the wing-membranes, and it is probably caused by desiccation.

Bz. 9. 3. 29. = 1269. Porto Real.

10. 3. 29. = 1270. Porto Real. "Lepidoptera began to appear more numerous in the end of Feby, and since the beginning of this month they appear abundant."

Westwood's list mentions another specimen captured on this date.

Bz. + 13. 3. 29. = 1271. Porto Real.

18. 3. 29. = 1272. "

Bz. + 21. 3. 29. = 1273. "

23. 3. 29. 2 = 1274, 1275. "

Bz. + 23. 3. 29. = 1276. "

Bz. + 25. 3. 29. = 1277. "

Westwood's list does not mention any individual caught on this date, but one taken 22. 3. 29,—probably an erroneous rendering of 1277.

28. 3. 29. = 1278. Porto Real.

Bz. + 28. 3. 29. = 1279. Porto Real.

22. 4. 29. 2 = 1280, 1281. "

Bz. + 22. 4. 29. = 1282. "

7. 8. 29. = 1283. Pará.

Westwood's list adds two more individuals captured at Porto Real 26. 2. 29 and 6. 3. 29. See note on 1268.

The data of this species appear, as A. 19, in Westwood's list of *Acræinae*. Opposite the very imperfect records Westwood had written "Ceth. Dido." Another list, on a small slip of paper, is in Westwood's handwriting, and this contains all the data here recorded except those of 1261. This separate list is headed "*Dido*."

[To be continued.]

### XV.—*The Char (Salvelinus) of Great Britain.*

By C. TATE REGAN, M.A.

FOUR species of Char have hitherto been described from the lakes of Great Britain: viz. *Salvelinus killinensis*, the Haddy of Loch Killin in Inverness-shire; *S. struanensis*, the Struan

of Loch Rannoch in Perthshire; *S. willughbii*, the Windermere Char; and *S. perisii*, the Torgoch of the mountain-lakes of Carnarvonshire. In spite of much that has been written to the contrary, these four species are quite distinct, as will be seen from a comparison of the descriptions given below and from the diagnostic characters shown in the following synopsis:—

- I. Snout obtuse; lower jaw rounded anteriorly, shorter than the upper.
- Interorbital width 3 to  $3\frac{1}{2}$  in the length of head, considerably more than the diameter of eye; least depth of caudal peduncle  $\frac{2}{3}$  to  $\frac{1}{2}$  the length of head; 182 to 215 scales in a longitudinal series . . . . . 1. *killinensis*.
- Interorbital width  $3\frac{2}{3}$  to 4 in the length of head, scarcely more than the diameter of eye; least depth of caudal peduncle  $\frac{1}{3}$  to  $\frac{2}{3}$  the length of head; 158 to 180 scales in a longitudinal series . . . . . 2. *struanensis*.
- II. Snout conical or subconical in the adult; lower jaw pointed anteriorly.
- Jaws equal anteriorly ( $\sigma$  ♀) or the lower the shorter (♀); interorbital region convex . . . . . 3. *willughbii*.
- Jaws equal anteriorly ( $\sigma$  ♀) or the lower projecting ( $\sigma$ ); interorbital region flat . . . . . 4. *perisii*.

### 1. *Salvelinus killinensis*.

*Salmo killinensis*, Günth. Proc. Zool. Soc. 1865, p. 699, pl. xl., and Cat. Fish. vi. p. 130 (1866); Day, Fish. Britain, p. 113, pl. cxviii. fig. 1 (1884).

Depth of body about 4 in the length, length of head  $3\frac{5}{8}$  to  $4\frac{1}{4}$  ( $\sigma$ ) or  $4\frac{1}{3}$  to  $4\frac{4}{5}$  (♀). Snout obtuse, with upper profile decurved, as long as or longer than eye, the diameter of which is  $4\frac{1}{2}$  to 6 in the length of head. Interorbital region more or less convex, its width 3 to  $3\frac{1}{2}$  in the length of head. Dentition moderate; lower jaw shorter than the upper; maxillary extending nearly to below the posterior margin of eye or a little beyond, its length  $2\frac{1}{4}$  to  $2\frac{1}{2}$  ( $\sigma$ ) or  $2\frac{2}{3}$  to  $2\frac{3}{4}$  (♀) in the length of head; lower jaw rounded anteriorly, its length  $1\frac{1}{2}$  to  $1\frac{3}{4}$  ( $\sigma$ ) or  $1\frac{3}{5}$  to  $1\frac{3}{4}$  (♀) in the length of head. 9 to 12 branchiostegals. 14 to 16 short gill-rakers on the lower part of anterior arch. 182 to 215 scales in a longitudinal series. Dorsal with 9 to 11 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray  $\frac{3}{5}$  to  $\frac{3}{4}$  the length of head. Anal with 8 or 9 branched rays. Pectoral from  $\frac{3}{4}$  to as long as the head, extending  $\frac{5}{8}$  to  $\frac{3}{4}$  ( $\sigma$ ) or  $\frac{1}{2}$  to  $\frac{2}{5}$  (♀) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  in its length and  $\frac{2}{3}$  to  $\frac{1}{2}$  the length of head. Back and sides plumbeous, belly

silvery or yellowish; small pale spots on the sides; fins dusky, the lower ones with pale anterior edges.

Loch Killin, Inverness-shire.

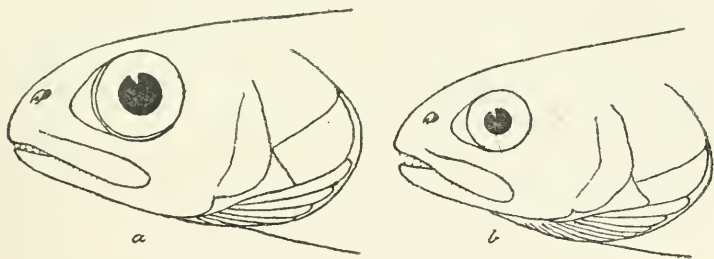
Several specimens, 200 to 350 mm. in total length, types of the species.

## 2. *Salvelinus struanensis*.

*Salmo struanensis*, Gibson-Maitland, Field, 1881, p. 516.

Depth of body 4 to 5 in the length, length of head  $3\frac{3}{4}$  to  $4\frac{1}{5}$ . Snout obtuse, with upper profile decurved, nearly as long as or a little longer than eye, the diameter of which is 4 to  $4\frac{1}{2}$  in the length of head. Interorbital region nearly flat, its width  $3\frac{2}{3}$  to 4 in the length of head. Dentition feeble or moderate; lower jaw shorter than and included within the upper; maxillary extending to below the posterior part of eye, its length  $2\frac{4}{5}$  in the length of head; lower jaw rounded anteriorly, its length  $1\frac{3}{4}$  to  $1\frac{5}{8}$  in the length of head. 10 branchiostegals. 13 or 14 short gill-rakers on the lower part of anterior arch. 158 to 180 scales in a longitudinal series.

Fig. 1.



a. *Salvelinus struanensis*. b. *S. inframundus*. ♂ s, natural size.

Dorsal with 9 branched rays, its origin nearly equidistant from the tip of snout and the base of caudal, the longest ray  $\frac{2}{3}$  to  $\frac{3}{4}$  the length of head. Anal with 8 branched rays. Pectoral  $\frac{3}{4}$  to  $\frac{7}{8}$  the length of head, extending  $\frac{2}{3}$  to  $\frac{3}{4}$  (♂) or a little less than  $\frac{2}{3}$  (♀) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  in its length and  $\frac{1}{3}$  to  $\frac{2}{5}$  the length of head.

*Hab.* Loch Rannoch, Perthshire.

Four specimens, three males and a female, 175 to 210 mm. in total length, including the types of the species.

3. *Salvelinus willughbii*.

*Salmo willughbii*, Günth. Proc. Zool. Soc. 1862, p. 46, pl. v., and Cat. Fish. vi. p. 131 (1866); Day, Fish. Britain, ii. p. 113, pl. cxvii. fig. 2 (1884).

Depth of body  $3\frac{3}{4}$  to 5 in the length, length of head 4 to  $4\frac{1}{4}$  ( $\sigma$ ) or  $4\frac{1}{4}$  to  $4\frac{2}{3}$  ( $\text{♀}$ ). Snout conical ( $\sigma$ ) or somewhat obtuse ( $\text{♀}$ ), as long as or longer than eye, the diameter of which is  $4\frac{1}{3}$  to 6 in the length of head. Interorbital region convex, its width 3 to  $3\frac{2}{3}$  in the length of head. Dentition moderate; jaws equal anteriorly or the lower jaw a little shorter than the upper ( $\text{♀}$ ); maxillary extending to below the posterior margin of pupil (young) or beyond the eye (adult  $\sigma$ ), its length  $2\frac{1}{2}$  to  $2\frac{5}{8}$  in the length of head; lower jaw pointed anteriorly, its length  $\frac{2}{3}$  (adult  $\sigma$ ) or less than  $\frac{2}{3}$  of the length of head. 9 to 12 branchiostegals. 11 to 16 moderately long gill-rakers on the lower part of anterior arch. 160 to 194 scales in a longitudinal series. Dorsal with 8 or 9 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray  $\frac{1}{2}$  to  $\frac{2}{3}$  the length of head. Anal with 7 to 9 branched rays. Pectoral  $\frac{2}{3}$  to  $\frac{2}{3}$  the length of head, extending  $\frac{3}{5}$  to  $\frac{3}{4}$  ( $\sigma$ ) or  $\frac{1}{2}$  to  $\frac{2}{3}$  ( $\text{♀}$ ) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{2}$  to 2 in its length and from  $\frac{1}{3}$  to more than  $\frac{2}{3}$  of the length of head. Greenish or bluish above, silvery or orange below; back and sides with orange spots; dorsal and caudal dusky; lower fins more or less red, the pelvics and anal with pale anterior edges.

Windermere.

Sixteen specimens, 160 to 290 mm. in total length, including the types of the species.

4. *Salvelinus perisii*.

*Salmo cambricus* (non Donovan.), Günth. Proc. Zool. Soc. 1862, p. 49, pl. vi.

*Salmo perisii*, Günth. Ann. & Mag. Nat. Hist. xv. 1865, p. 75, and Cat. Fish. vi. p. 133 (1866); Day, Fish. Britain, p. 112, pl. cxix. fig. 2 (1884).

Depth of body 4–5 in the length, length of head  $3\frac{1}{2}$ –4 ( $\sigma$ ) or  $4\frac{1}{4}$ – $4\frac{1}{2}$  ( $\text{♀}$ ). Snout conical, pointed, as long as or longer than eye, the diameter of which is  $4\frac{1}{3}$ –5 in the length of head. Interorbital region flat, its width  $3\frac{1}{2}$ – $3\frac{3}{4}$  in length of head. Dentition rather strong; jaws equal anteriorly ( $\sigma$   $\text{♀}$ ) or the lower projecting ( $\sigma$ ); maxillary extending nearly to below the posterior margin of eye or a little beyond, its length  $2\frac{1}{3}$ – $2\frac{2}{3}$  ( $\sigma$ ) or  $2\frac{2}{3}$ – $2\frac{2}{3}$  ( $\text{♀}$ ) in the length of head;

lower jaw pointed anteriorly, its length  $1\frac{3}{4}$ – $1\frac{1}{2}$  ( $\sigma$ ) or  $1\frac{1}{2}$ – $1\frac{2}{3}$  ( $\text{♀}$ ) in the length of head. 10–11 branchiostegals. 13–16 slender gill-rakers on the lower part of anterior arch. 156–188 scales in a longitudinal series. Dorsal with 9 or 10 branched rays, its origin a little nearer to the tip of snout than the base of caudal, the longest ray  $\frac{2}{3}$ – $\frac{2}{5}$  the length of head. Anal with 8 or 9 branched rays. Pectoral  $\frac{3}{4}$ – $\frac{4}{5}$  the length of head, extending  $\frac{2}{3}$  to more than  $\frac{3}{4}$  ( $\sigma$ ) or  $\frac{2}{5}$  ( $\text{♀}$ ) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{2}$ –2 in its length and  $\frac{1}{3}$ – $\frac{2}{5}$  the length of head. Dark greenish above, silvery or orange below; sides with orange spots; fins more or less dusky, the lower fins tinged with orange and with pale anterior margins.

Lakes of Llanberis, Carnarvonshire, North Wales.

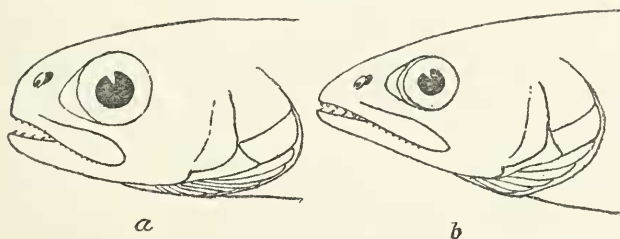
The above description is based on the types of the species, twelve examples, 180–235 mm. in total length.

The following five species of Char are so distinct from each other and from the ones described above that I have little hesitation in describing them as new.

1. *Salvelinus gracillimus*, sp. n.

Depth of body  $5\frac{1}{2}$  to  $6\frac{1}{2}$  in the length, length of head 4 to  $4\frac{1}{2}$ . Snout obtuse, as long as or a little longer than eye, the diameter of which is  $4\frac{1}{4}$  to 5 in the length of head. Inter-orbital region nearly flat, its width  $3\frac{1}{2}$  in the length of head. Dentition moderate; jaws equal anteriorly; maxillary

Fig. 2.



a. *Salvelinus gracillimus*. b. *S. lonsdalii*.  $\sigma$ s, natural size.

extending to below the posterior part of eye, its length  $2\frac{2}{5}$  to  $2\frac{5}{8}$  in the length of head; lower jaw somewhat pointed anteriorly, its length from less than  $\frac{3}{5}$  to  $\frac{2}{3}$  the length of head. 9 branchiostegals. 13 or 14 moderately elongate gill-rakers

on the lower part of anterior arch. 164 to 186 scales in a longitudinal series. Dorsal with 8 or 9 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray about  $\frac{2}{3}$  the length of head. Anal with 7 or 8 branched rays. Pectoral  $\frac{3}{4}$  to  $\frac{7}{8}$  the length of head, extending  $\frac{2}{3}$  to  $\frac{3}{4}$  of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{3}$  to  $2\frac{1}{3}$  in its length and  $\frac{1}{3}$  the length of head. Back and sides, with dorsal and caudal fins, bluish grey; belly silvery or orange; orange spots on the sides.

*Hab.* Loch of Girlsta, Tingwall, Shetlands.

Four male specimens, 150 to 200 mm. in total length, three of them recently presented by Mr. J. S. Tulloch, who tells me that Girlsta is the only char loch in the Shetlands.

## 2. *Salvelinus inframundus*, sp. n.

Depth of body  $4\frac{1}{2}$  to  $4\frac{2}{3}$  in the length, length of head  $4\frac{1}{4}$  to  $4\frac{1}{2}$ . Snout obtuse, with upper profile decurved throughout, a little longer than eye, the diameter of which is  $5\frac{1}{4}$  to  $5\frac{1}{2}$  in the length of head. Interorbital region convex, its width  $3\frac{1}{3}$  to  $3\frac{1}{2}$  in the length of head. Dentition feeble; lower jaw shorter than and included within the upper; maxillary extending nearly to below the posterior margin of eye, its length  $2\frac{3}{4}$  in the length of head; lower jaw rounded anteriorly, its length  $1\frac{3}{4}$  to  $1\frac{4}{5}$  in the length of head. 10 or 11 branchiostegals. 13 or 14 rather short gill-rakers on the lower part of anterior arch. 178 to 195 scales in a longitudinal series. Dorsal with 9 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray  $\frac{2}{3}$  the length of head. Anal with 8 or 9 branched rays. Pectoral a little more than  $\frac{2}{3}$  the length of head, extending  $\frac{1}{2}$  of the distance from its base to the base of pelvics. Least depth of caudal peduncle 2 in its length and  $\frac{1}{3}$  to  $\frac{2}{3}$  the length of head. 59 vertebræ. Colour in spirits: brownish on back and sides, paler below; some small pale spots on the sides; dorsal and caudal fins dusky.

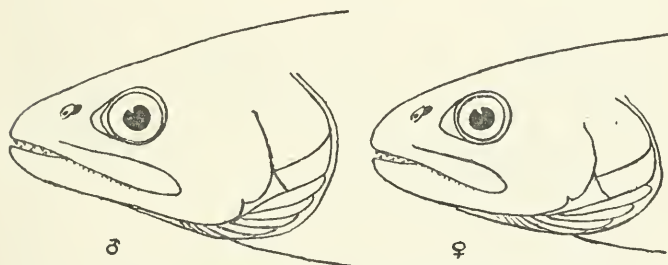
This description is based on two male specimens, 185 and 195 mm. in total length, from Hellyal Lake, Hoy Island, Orkneys, presented by Dr. Trail in 1862.

During the last few years Mr. William Cowan has made attempts to get more examples of this interesting form, but without success. I have it on his authority that char are not found in any other lakes in the Orkneys. Mr. T. Middlemore, who owns the lake, has also made unsuccessful efforts to catch some char; none have been captured since he has been the proprietor, and he believes they are extinct.

3. *Salvelinus maxillaris*, sp. n.

Depth of body  $4\frac{1}{4}$  to  $5\frac{1}{3}$  in the length, length of head  $3\frac{1}{5}$  to  $4\frac{1}{5}$  ( $\sigma$ ) or  $4\frac{1}{3}$  to  $4\frac{3}{5}$  ( $\varphi$ ). Snout subconical ( $\sigma$ ) or obtuse, with upper profile decurved ( $\varphi$ ), longer than eye, the diameter of which is  $5\frac{1}{2}$  to  $6\frac{2}{3}$  in the length of head. Interorbital region convex, its width  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in the length of head. Dentition moderate; jaws equal anteriorly ( $\sigma$ ) or the lower a little shorter than the upper ( $\varphi$ ); maxillary extending to below the posterior margin of eye ( $\varphi$ ) or beyond ( $\sigma$ ), its length  $2\frac{1}{4}$  to  $2\frac{1}{2}$  ( $\sigma$ ) or  $2\frac{1}{2}$  to  $2\frac{2}{3}$  ( $\varphi$ ) in the length of head; lower jaw obtusely pointed anteriorly, its length  $\frac{2}{3}$  to more than  $\frac{3}{4}$  ( $\sigma$ ) or  $\frac{2}{3}$  or less ( $\varphi$ ) of the length of head. 10 or 11 branchiostegals. 14 or 15 rather slender gill-rakers on the lower part of anterior arch. 168 to 186 scales in a longitudinal series. Dorsal with 9 to 11 branched rays, its origin equidistant from the tip of snout and the base

Fig. 3.

*Salvelinus maxillaris*,  $\frac{3}{4}$  natural size.

of caudal or a little nearer the former, the longest ray  $\frac{1}{2}$  to  $\frac{2}{3}$  the length of head. Anal with 8 to 10 branched rays. Pectoral  $\frac{2}{3}$  to  $\frac{5}{8}$  the length of head, extending  $\frac{1}{2}$  to  $\frac{2}{3}$  ( $\sigma$ ) or  $\frac{1}{2}$  or a little less ( $\varphi$ ) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{1}{2}$  to 2 in its length and about  $\frac{1}{3}$  the length of head. 64 vertebrae. Back and sides, with the dorsal and caudal fins, plumbeous; belly brilliant orange; small orange spots on the sides, mostly below the lateral line; pectoral greenish, with a red margin; pelvics and anal reddish, with a white anterior edge; caudal with an orange margin.

*Hab.* Loch near Ben Hope, Sutherlandshire.

Eleven specimens, 210 to 280 mm. in total length, one

presented by Mr. R. Etheridge in 1873 and the others recently sent to me by Mr. John Murray at the request of Dr. F. Penrose.

4. *Salvelinus mallochii*, sp. n.

Depth of body  $4\frac{1}{2}$  in the length, length of head  $4\frac{1}{3}$  to  $4\frac{1}{2}$  ( $\sigma$ ) or  $4\frac{3}{5}$  to  $4\frac{4}{5}$  ( $\text{♀}$ ). Snout obtuse, longer than eye, the diameter of which is  $5\frac{1}{2}$  to 6 in the length of head. Interorbital region convex, its width 3 to  $3\frac{2}{5}$  in the length of head. Dentition moderate; lower jaw a little shorter than the upper; maxillary extending nearly to below the posterior margin of eye or a little beyond, its length  $2\frac{2}{5}$  to  $2\frac{3}{5}$  in the length of head; lower jaw obtusely pointed anteriorly, its length  $\frac{3}{5}$  to  $\frac{2}{3}$  of the length of head. 9 to 11 branchiostegals. 13 or 14

Fig. 4.



*Salvelinus mallochii*,  $\frac{3}{4}$  natural size.

rather slender gill-rakers on the lower part of anterior arch. 188 to 200 scales in a longitudinal series. Dorsal with 10 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray  $\frac{1}{2}$  to  $\frac{3}{5}$  the length of head. Anal with 8 or 9 branched rays. Pectoral  $\frac{2}{3}$  to  $\frac{7}{8}$  the length of head, extending  $\frac{1}{2}$  to  $\frac{3}{5}$  ( $\sigma$ ) or a little less than  $\frac{1}{2}$  ( $\text{♀}$ ) of the distance from its base to the base of pelvics. Least depth of caudal peduncle  $1\frac{3}{4}$  to 2 in its length and  $\frac{1}{3}$  to  $\frac{2}{5}$  the length of head. Slate-coloured above, whitish tinged with orange below; numerous pale spots covering the back as well as the sides.

*Hab.* Loch Scourie, Sutherlandshire.

Four specimens, 220 to 290 mm. in total length.

I have named this species after the donor, Mr. P. D. Malloch, the well-known naturalist of Perth.



5. *Salvelinus lonsdalii*, sp. n.

Depth of body  $4\frac{1}{2}$  to 5 in the length, length of head 4 ( $\sigma$ ) or  $4\frac{1}{2}$  ( $\varphi$ ). Snout subconical, longer than eye, the diameter of which is  $4\frac{2}{3}$  to  $5\frac{1}{3}$  in the length of head. Interorbital region slightly convex, its width  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in the length of head. Dentition moderate; jaws equal anteriorly; maxillary extending to below the posterior margin of pupil ( $\varphi$ ) or beyond ( $\sigma$ ), its length  $2\frac{1}{2}$  ( $\sigma$ ) or  $2\frac{2}{3}$  ( $\varphi$ ) in the length of head; lower jaw pointed anteriorly, its length more than  $\frac{2}{3}$  ( $\sigma$ ) or a little less than  $\frac{2}{3}$  ( $\varphi$ ) of the length of head. 9 to 11 branchiostegals. 13 slender gill-rakers on the lower part of anterior arch. 166 to 182 scales in a longitudinal series. Dorsal with 9 branched rays, its origin a little nearer to the tip of snout than the base of caudal, the longest ray  $\frac{2}{3}$  to  $\frac{3}{4}$  the length of head. Anal with 8 branched rays. Pectoral  $\frac{5}{6}$  to  $\frac{7}{8}$  the length of head, extending  $\frac{4}{5}$  ( $\sigma$ ) or nearly  $\frac{2}{3}$  ( $\varphi$ ) of the distance from its base to the base of pelvics. Least depth of caudal peduncle about  $1\frac{3}{4}$  in its length and about  $\frac{2}{5}$  the length of head. Bluish black above, orange below; numerous orange spots on the sides; dorsal and caudal dusky.

Haweswater.

Two specimens, 170 mm. in total length, presented by the Earl of Lonsdale, after whom I have named the species.

This species is distinguished from *S. willughbii* especially by the much longer lower jaw and bears a great resemblance to *S. perisii*, from which it differs in the smaller eye and in having the dorsal fin a little higher and the pectorals rather longer.

Day (Fish. Britain, ii. p. 116) quotes J. Davy to the effect that the Char of Haweswater is a small and slender fish compared with that of Windermere. Sir H. Davy's figures ('Salmonia,' p. 260, 1851) show well the main difference between the two forms. Mr. W. H. Parkin writes me that the Char caught in Haweswater hardly vary at all in size.

Char from other British localities in the National Collection include some forms which seem to be practically identical with one or other of the species described above, and others which may prove to be sufficiently different to be described later on as distinct species; in some cases more specimens are wanted in order to determine how far the differences observed may be constant; in other cases I have seen enough examples to determine pretty accurately the normal variation of the char in certain lochs, but these forms differ so slightly from their nearest allies that I do not venture to describe them until

I have examined specimens from intermediate localities. There are still a number of lochs in Sutherlandshire, Ross-shire, and Inverness-shire which contain Char, but from which I have not yet seen any.

In the following list of specimens I have examined I give in each case the number of branched rays in the dorsal fin (D) and in the anal fin (A), the number of scales in a longitudinal series (Sc.), of branchiostegals (B), and of gill-rakers on the lower part of the anterior arch (Gr.).

(1) *Char allied to S. killinensis.*

1. LOCH ROY, a small loch at the head of Glen Roy in Inverness-shire; a single specimen (♂), 160 mm. in total length, presented by Mr. H. Cholmøndeley Pennell in 1862. D. 7; A. 8; Sc. 160; B. 9; Gr. 15. Head perhaps a little smaller and scales larger than in the Killin Char, but, considering the variation in the number of scales in other forms, *e. g.* the Loch Loyal Char, and our ignorance of the Char of other lochs in Inverness-shire (except L. Bruiach), I cannot yet recognize this form as even a distinct race.

(2) *Char allied to S. willughbii.*

1. CONISTON LAKE; three specimens (♀) 190 to 240 mm. in total length, presented by Mr. J. W. Barratt. D. 9-10; A. 8-9; Sc. 186-198; B. 10-11; Gr. 12-13. Nearly identical with the Windermere Char.

2. CRUMMOCK WATER; four specimens (♂ ♀) 270 to 280 mm. in total length, presented by Mr. W. H. Marshall. D. 9-10; A. 8; Sc. 160-170; B. 9-12; Gr. 12-14. Practically identical with the Windermere Char.

These examples were in splendid condition, and when they arrived I drew up the following description of their coloration:—"Back and sides bluish, with silvery reflections and with numerous pink spots everywhere; faint traces of 9-12 parr-marks; lower parts red; snout, upper part of head, and sometimes the maxillary blackish; lower jaw, branchiostegals, and thorax white; cheeks and opercles silvery, with shades of green, blue, or pink; iris golden, pupil black; dorsal and caudal fins blackish, with or without pale spots at the base; pectoral dusky, tinged with red, sometimes with the upper ray whitish; pelvics and anal similar, but redder and with strongly marked white anterior edges."

3. LOCH GRANNOCH in Kirkeudbrightshire; eight specimens (♂ ♀), 160-230 mm. in total length, three presented

by Mr. Robert Service and five by Mr. G. R. Murray. D. 9-10; A. 7-8; Sc. 154-176; B. 8-11; Gr. 11-13. A race of *S. willughbii*, assuming adult characters at a smaller size.

4. LOCH DUNGEON in Kirkcudbrightshire; one specimen ( $\sigma$ ), 160 mm. in total length, received on loan from the Edinburgh Museum. D. 10; A. 8; Sc. 180; B. 10; Gr. 13. A race of *S. willughbii*; lower jaw weaker and opercular bones broader than in the Grannoch Char.

5. LOCH DOON in Ayrshire; eleven specimens ( $\sigma$   $\text{\textit{f}}$ ), 160-180 mm. in total length, presented by Mr. R. Service. D. 8-9; A. 8-9; Sc. 146-174; B. 9-10; Gr. 12-14. A small race of *S. willughbii*, very similar to the Grannoch Char, *usually* with mouth larger, opercular bones narrower, and paired fins longer than in Windermere Char of this size.

6. LOCH BUILG in Banffshire; four specimens ( $\sigma$   $\text{\textit{f}}$ ), 180-220 mm. in total length, presented by Messrs F. D. Godman and W. R. O. Grant. D. 9-10; A. 7-9; Sc. 160-180; B. 9-11; Gr. 14-15.

7. LOCH BRUIACH in Inverness-shire; ten specimens ( $\sigma$   $\text{\textit{f}}$ ), 175-190 mm. in total length, presented by Lord Lovat. D. 8-10; A. 7-9; Sc. 155-178; B. 9-11; Gr. 14-16. A small race of *S. willughbii*; coloration dark; pelvic axillary scale long.

8. LOCH MORIE in Ross-shire; one specimen ( $\sigma$ ), 200 mm. in total length, presented by Mr. H. M. Warrand. D. 9; A. 8; Sc. 156; B. 10; Gr. 16. Similar to the Bruiach Char.

9. LOCH BOROLLAN in Sutherlandshire; two specimens ( $\sigma$ ), 150 and 165 mm. in total length, from Dr. F. Day's collection. D. 10; A. 8; Sc. 166-172; B. 9-10; Gr. 15.

10. LOCH LOYAL in Sutherlandshire; thirty-eight specimens ( $\sigma$   $\text{\textit{f}}$ ), 150-200 mm. in total length, presented by Mr. John Murray. D. 8-11; A. 7-9; Sc. 126-178; B. 8-12; Gr. 11-16. A small race of *S. willughbii*, according to Mr. Murray never attaining a larger size. The range of variation in the number of scales is most remarkable.

11. LOCH BADEN in Sutherlandshire; two specimens ( $\text{\textit{f}}$ ), 165 and 185 mm. in total length, presented by Mr. P. D. Malloch. D. 9-10; A. 8-9; Sc. 148-152; B. 9-10; Gr. 16-17. Head smaller than in the Loch Loyal Char.

12. LOCH CALDER in Caithness; a stuffed specimen of 230 mm., received on loan from the Edinburgh Museum. D. 9; A. 8; Sc. 166. Apparently identical with the Baden Char.

13. NORTH UIST; a single specimen (♂), 260 mm. in total length, presented by Sir A. J. Campbell Orde. D. 10; A. 9; Sc. 175; B. 10; Gr. 14. A short-headed form of *S. willughbii*; silvery, back bluish.

(3) *Char allied to S. perisii.*

1. COSS-Y-GEDAWL in Merionethshire; four specimens, 125-150 mm. in total length, from Yarrell's collection. D. 9-10; A. 8-9; Sc. 144-166; B. 9-10; Gr. 14-16. Probably not distinct from the Llanberis Char.

(4) *Char allied to S. maxillaris.*

1. LOCH STACK in Sutherlandshire; two specimens (♀), 215 and 220 mm. in total length. D. 9; A. 8-9; Sc. 182-194; B. 9-10; Gr. 14-15. Nearly identical with the Char from Ben Hope, but paired fins a little longer than in female specimens from that locality, the pectorals extending  $\frac{2}{3}$  to  $\frac{3}{4}$  of the distance from their base to the pelvis.

XVI.—*On some new and rare Entomostraca from the Scottish Seas.* By THOMAS SCOTT, LL.D., F.L.S.

[Plates II.-IV.]

THE Entomostraca described here were obtained in collections made from time to time by the Fishery Steamer 'Goldseeker' while carrying on work in connexion with the international scheme for the investigation of the North Sea and adjacent waters, and under the directions of Professor d'Arcy W. Thompson, C.B., F.L.S., the representative for Scotland on the International Committee.

For permission to publish these notes I am indebted to Professor Thompson.

CALANOIDA.

*Xanthocalanus tenuiremis*, sp. n. (♂).  
(Pl. II. figs. 1-7.)

A specimen of a male *Xanthocalanus* was obtained in a